

What is claimed is:

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1. A plasma display apparatus comprising a plasma display equipped with the first electrodes and the second electrodes arranged adjacently by turns, and the address electrodes extending in the direction that runs at a right angle to the direction the said first and second electrodes extend, an X sustaining circuit that supplies sustaining pulses to the said first electrodes, and a Y sustaining circuit that supplies sustaining pulses to the said second electrodes, wherein, the said X sustaining circuit and the said Y sustaining circuit are equipped with phase adjusting circuits that adjust the timing of the changing edge of the said sustaining pulse.

2. A plasma display apparatus, as set forth in claim 1, wherein the said X sustaining circuit and the said Y sustaining circuit include power recovery circuits each of which has a resonant circuit formed with a display capacitor of the said plasma display panel, recovers energy when the application of the said sustaining pulse is released and uses the recovered energy for the next application of the said sustaining pulses, is provided.

3. A plasma display apparatus, as set forth in claim 2, wherein the said X sustaining circuit and the said Y sustaining circuit comprise the first and the second output devices connected between a path through which the said sustaining pulses are supplied and a high voltage power source line, and between the path and a low voltage power source line, respectively, the third output device that switches the connection state of the said path and the said power recovery circuit to the state in which power is supplied from the said power recovery circuit to the said path, the fourth output device that switches the connection state of the said path and the said power recovery circuit to the state in which power is recovered from the said path to the said power recovery circuit, and the first through the fourth drive

circuits that drive the said first through the fourth output devices; and the said phase adjusting circuit can adjust the time difference between turning on of the said third output device and that of the said first output device, and the time difference between the turning on of the said fourth output device and that of the said second output device.

4. A plasma display apparatus, as set forth in claim 3, wherein the said phase adjusting circuit comprises the first through the fourth phase adjusting circuits provided at each former stage of the said first through the fourth drive circuits, respectively.

5. A plasma display apparatus, as set forth in claim 1, wherein the said plasma display panel forms the first display line between one side of the said second electrode and the adjacent said first electrode, the second display line between the other side of the said second electrode and the adjacent said first electrode, and forms a display field of a frame by plural subfields, and provides a gray scale by combining said subfields selectively for display; the said X sustaining circuit is equipped with a first X sustaining circuit that supplies the said sustaining pulse to an odd-numbered electrode of the said first electrodes, and a second X sustaining circuit that supplies the said sustaining pulse to an even-numbered electrode of the said first electrodes; and the said Y sustaining circuit is equipped with a first Y sustaining circuit that supplies the said sustaining pulse to an odd-numbered electrode of the said second electrodes, and a second Y sustaining circuit that supplies the said sustaining pulse to an even-numbered electrode of the said second electrodes.

6. A plasma display apparatus, as set forth in claim 5, wherein the said first and the second X sustaining circuits and the said first and the second Y sustaining circuits are equipped with the said phase adjusting circuits, respectively; and the difference in

rising or falling timing between the sustaining pulse output by the said first X sustaining circuit and that output by the said first or the second Y sustaining circuit, and the difference in rising or falling timing between the sustaining pulse output by the said second X sustaining circuit and that output by the said first or the second Y sustaining circuit are adjusted so that the differences of the timings are within a predetermined range.

7. A plasma display apparatus, as set forth in claim 6, wherein the said predetermined range is within ± 30 ns.

8. A plasma display apparatus, as set forth in claim 1, wherein the said phase adjusting circuit is set by observing the waveform when the said sustaining pulse is applied to the said first or second electrode of the said plasma display panel.

9. A manufacturing method of a plasma display apparatus comprising a plasma display panel having first electrodes and second electrodes arranged adjacently by turns and address electrodes extending in the direction that runs at a right angle to the direction the said first and second electrodes extend, an X sustaining circuit that supplies a sustaining pulse to the said first electrodes, and a Y sustaining circuit that supplies a sustaining pulse to the said second electrodes, wherein delay times of circuit devices with respect to signals, which form the said X sustaining circuit and the said Y sustaining circuit, are measured and the circuit devices are classified according to the delay times; sets of the classified circuit devices are selected so that the timing of the changing edge of the said sustaining pulse falls within a predetermined allowance; and the sets of the selected circuit devices are set to the plasma display apparatus.

10. A manufacturing method of a plasma display apparatus, as set forth in claim 9, wherein the said

plasma display panel forms a first display line between one side of the said second electrode and the adjacent said first electrode, a second display line between the other side of the said second electrode and the adjacent said first electrode, forms a display field of a frame by plural subfields, and provides the gray scale by combining said subfields selectively for display; the said X sustaining circuit is equipped with a first X sustaining circuit that supplies the said sustaining pulse to an odd-numbered electrode of the said first electrodes, and a second X sustaining circuit that supplies the said sustaining pulse to an even-numbered electrode of the said first electrodes; the said Y sustaining circuit is equipped with a first Y sustaining circuit that supplies the said sustaining pulse to an odd-numbered electrode of the said second electrodes, and a second Y sustaining circuit that supplies the said sustaining pulse to an even-numbered electrode of the said second electrodes; and the difference in rising or falling timing between the sustaining pulse output by the said first X sustaining circuit and that output by the said first or the second Y sustaining circuit, and the difference in rising or falling timing between the sustaining pulse output by the said second X sustaining circuit and that output by the said first or the second Y sustaining circuit are adjusted so that the differences of timings are within a predetermined range, when the circuit devices of the said first and second X sustaining circuits and the said first and second Y sustaining circuits are selected.

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